

PATENT ABSTRACTS OF JAPAN

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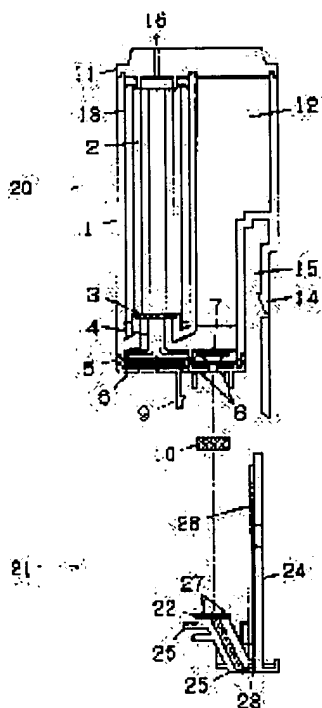
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(54) INK JET HEAD CARTRIDGE



(57)Abstract:

PURPOSE: To provide an ink jet head cartridge wherein each ink passage in a connection section between a recording head and an ink tank can be separated so that leakage of an ink is prevented, the section is reduced in size and the recording head and ink tank can be separated.

CONSTITUTION: An ink tank unit 20 and a recording head unit 21 are connected via an elastic member 10. Protruding sections 8 are provided on a surface of a second bottom plate 6 of the ink tank 20 that contacts with the elastic member 10 so as to divide each ink passage. Protruding sections 21 similar to the above are provided on a connection section 22 of the recording head unit 20. When the ink tank unit 20 and the recording head unit 21 are connected with each other, a claw 9 and a rib 26 are fitted with each other, the protruding sections 8 is pressed against the elastic member 10 and the protruding sections 27 is against the elastic member 10 so that mixture or leakage of inks in

each ink passage is not generated in this section. It is possible to separate them in this section and to recycle them.

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CLAIMS

[Claim(s)]

[Claim 1] The ink jet head cartlidge characterized by to have the heights for isolating ink passage to one [at least] field of the recording head unit which has the ink discharge part which carries out the regurgitation of the ink in an end section side, the elastic member in which it was prepared in the joining segment of said ink tank and said recording head unit, and the hole of only the number of passes of ink was drilled in the ink jet head cartlidge which has two or more ink tanks which supply ink to said ink discharge part, and this elastic member, and the field which confronts each other.

[Claim 2] It is the ink jet head cartlidge according to claim 1 characterized by pressing said elastic member to said heights while it has the engagement means which carries out engagement maintenance of said ink tank and said recording head unit and said engagement means connects a recording head unit with said ink tank.

[Claim 3] Said engagement means is an ink jet head cartlidge according to claim 2 characterized by being constituted by the fitting section corresponding to the claw part in which elastic deformation is possible, and said claw part.

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to the ink jet head cartlidge used for the ink jet recording apparatus which records by breathing out ink.

[0002]

[Description of the Prior Art] In recent years, the device set as the application object of an ink jet recording device has become wide range, and many ink jet cartridges which unified the recording head and the ink tank are introduced into the commercial scene. The ink passage which connects an ink tank and a recording head with actual goods has many for which the O ring is used as an ink leakage prevention means. Although there is no concern of the color mixture in ink passage of one ink jet cartridge what has ink of only one color, by the ink jet head cartlidge which unified yellow, the Magenta, and the recording head and ink tank of three colors of cyanogen, we are anxious about the problem of the color mixture in the connection of ink passage, for example.

[0003] As a well-known ink jet head cartlidge For example HEWLETT-PACKARD JOURNAL, AUGUST 1992, VOLUME43 and NUMBER4, "Automatic Assembly of theHP Desk Jet 500

C/Desk writer C Color Print As indicated by Cartridge" There is an ink jet cartridge which unified yellow, the Magenta, and the recording head and ink tank of three colors of cyanogen, and a part for the joint of ink passage is reported by this reference. According to the publication of this reference, the color mixture in ink passage is lost by applying adhesives to the perimeter of the feed hopper of three colors each.

[0004] However, by this approach, lock out of the passage by the flash of adhesives occurs, and there is concern which bars supply of ink. In order to prevent it, the coater of highly precise adhesives is required, and needed to prepare the inspection process of a spreading condition, and had led to the rise of a manufacturing cost.

[0005] In recent years, the demand of recycle of a product and components is increasing from positions, such as environmental protection and saving resources. However, with the means indicated by above-mentioned reference, although the recording head and the ink tank could be unified, it was not the optimal means to the demand of dissociating separately and recycling a recording head and an ink tank, after collecting ink jet cartridges. That is, since the recording head and the ink tank were pasted up with adhesives, it had the trouble that separation of a recording head and an ink tank was impossible.

[0006] As another cure, it is possible to equip independently a part for the bond part of each ink passage with an O ring etc., respectively. If an O ring is generally used, separation of separation between the ink passage of each color, ink leakage prevention, a recording head, and an ink tank should be able to be solved to coincidence. However, from constraint of the size of an O ring, it could not consider as the desired diameter of passage and desired passage spacing, especially was not able to miniaturize.

[0007] For example, also in the ink jet print head indicated by JP,1-110965,A, the ink in an ink tank passes along the ink passage where a front plate is constituted by the periphery of the shape of a bead prepared in the closure plate by compressing, and is supplied to the print head. In this example, ink passage is connected by one place, without connecting using a closure member like an O ring for every ink passage. However, separating a recording head and an ink tank is not considered with such a configuration.

[0008]

[Problem(s) to be Solved by the Invention] This invention was made in view of the situation mentioned above, and it miniaturizes this part while it separates between each ink passage in the bond part of a recording head and an ink tank and aims at ink leakage prevention, and it aims at offering the ink jet head cartlidge which can separate a recording head and an ink tank further.

[0009]

[Means for Solving the Problem] In the ink jet head cartlidge which has the recording head unit which has the ink discharge part where this invention carries out the regurgitation of the ink in an end section side, and two or more ink tanks which supply ink to said ink discharge part It is characterized by having the heights for isolating ink passage to one [at least] field of the elastic member in which it was prepared in the joining segment of said ink tank and said recording head unit, and the hole of only the number of passes of ink was drilled, and this elastic member, and the field which confronts each other.

[0010] Moreover, while it has further the engagement means which carries out engagement maintenance of said ink tank and said recording head unit and said engagement means connects a recording head unit with said ink tank, it is characterized by pressing said elastic member to said heights. The fitting section corresponding to the claw part in which elastic deformation is possible, and said claw part can constitute said engagement means.

[0011]

[Function] According to this invention, in the joining segment of an ink tank and a recording head unit, when an elastic member is pressed by the heights prepared at least in one side by the side of an ink tank or a recording head unit, the positive sealing effectiveness can be acquired and this does not produce faults, such as leakage of ink, and mixing of ink. Heights can be prepared for the both sides by the side of an ink tank and a recording head unit, they can also be constituted so that it may press by heights from both sides of an elastic member, and they can acquire the more positive sealing effectiveness. An ink tank and a recording head unit consist of the press sections to the elastic member of heights disengageable. Moreover, the hole of only the ink number of passes is prepared in the elastic member, separation of two or more ink passage and sealing can be performed by one member, and it can miniaturize easily.

[0012] Thrust is automatically given to an elastic member at the same time an ink tank and a recording head unit are combined by establishing the engagement means which carries out engagement maintenance of an ink tank and the recording head unit. An ink tank and a recording head unit are [after collecting ink jet head cartlidges] separable by using the fitting section corresponding to the claw part in which elastic deformation is possible, and said claw part as an engagement means.

[0013]

[Example] Drawing 1 and drawing 2 are the block diagrams of the ink tank unit in one example of the ink jet head cartlidge of this invention. the inside of drawing, and 1 -- an ink tank and 2 -- the felt and 3 -- a reticulated member and 4 -- a core material and 5 -- the 1st bottom plate and 6 -- the 2nd bottom plate and 7 -- a filter and 8 -- heights and 9 -- a pawl and 10 -- for an ink room and 13, as for a fitting member and 15, a felt room and 14 are [an elastic member and 11 / top covering and 12 / a slot and 16] atmospheric-air free passage holes. The illustrated ink tank unit shows as an example the case where it has the three hold sections of ink. The hold section of each ink can be filled up with the ink of each color of yellow, a Magenta, and cyanogen.

[0014] The ink tank 1 which contains ink is divided into the ink room 12 and the felt room 13 for every hold section of each ink. The ink room 12 stores ink. The felt 2 holding ink is built in the felt room 13. Moreover, in the connection section of the felt room 13 and the ink room 12, the reticulated member 3 and the core material 4 possess. The ink room 12 and the felt room 13 are open for free passage through this reticulated member 3. A core material 4 supplies the ink in the ink room 12 to the reticulated member 3. Thereby, the reticulated member 3 is held at the condition of having always got wet in ink.

[0015] As for the upper part of the ink tank 1, it is equipped with the top covering 11. To the top covering 11, it has the atmospheric-air free passage hole 16 in the up location of the felt room 13. Although the upper part of the ink room 12 is constituted at the time of use of an ink jet head cartlidge so that the ink room 12 may be sealed, it may prepare opening for pouring in ink at the time of manufacture, for example.

[0016] The pars basilaris ossis occipitalis of the ink tank 1 is closed by the 1st bottom plate 5 and 2nd bottom plate 6. Corresponding to each ink room 12, the hole which derives ink from each ink room 12 is prepared in the 1st bottom plate 5, and it is equipped with the filter 7 which **** the dust in ink into the part of the hole, respectively. The passage of the ink drawn from the hole prepared in the 1st bottom plate 5 is formed in the 2nd bottom plate 6, and it is led to a joint with the recording head unit which ink flows and does not illustrate between the 1st bottom plate 5 and the 2nd bottom plate 6. Corresponding to each ink passage, the hole is prepared in the joint with the recording head unit of the 2nd bottom plate 6, and heights 8 are formed in it so that the

part of each hole may be isolated. Moreover, the pawl 9 is formed in the 2nd bottom plate 6, and a recording head unit is stopped. On the other hand, the hole corresponding to each ink passage is prepared, by carrying out a pressure welding to the 2nd bottom plate 6, an elastic member 10 and heights 8 stick to the sheet-like elastic member 10, and each ink passage is sealed. The 1st bottom plate 5, the 2nd bottom plate 6, and the top covering 11 are fixed by ultrasonic welding, respectively. An adhesion means is not restricted to what is depended on ultrasonic welding, but can use various approaches, such as the usual adhesives and heat welding.

[0017] The slot 15 for containing further the electrical circuit part of the recording head unit which is not illustrated is formed in the ink tank 1, and when equipped with a recording head unit, it has the fitting member 14 for fixing an electrical circuit part.

[0018] Drawing 3 is the enlarged drawing of a joint with the recording head unit of the 2nd bottom plate 6. As shown in drawing 3 (B), the heights 8 prepared in the 2nd bottom plate 6 are formed so that the hole prepared corresponding to each ink passage may be surrounded. An elastic member 10 becomes good [the sealing nature of each ink passage] by carrying out a pressure welding to these heights 8. Thereby, in this joint, the ink of each ink passage is not mixed and it does not begin to leak. Furthermore, since two or more ink passage is combined using one elastic member 10 while being able to narrow spacing between each ink passage and being able to miniaturize compared with the case where an O ring etc. is used for every ink passage, components mark can be decreased.

[0019] Drawing 4 and drawing 5 are the sectional views in one example of the ink jet head cartidge of this invention. Among drawing, the same sign is given to the same part as drawing 1 and drawing 2 , and explanation is omitted. 20 -- an ink tank unit and 21 -- a recording head unit and 22 -- for a heat sink and 25, as for a rib and 27, a manifold and 26 are [the connection section and 23 / a substrate and 24 / a projection and 28] printing chips. Drawing 4 illustrates the condition that the ink tank unit and the recording head unit are separated, and drawing 5 is illustrating the condition of having been united.

[0020] The recording head unit 21 consists of manifolds 25 for supplying ink to the substrate 23 which tells an electrical signal to the printing chip 28 which carries out the regurgitation of the ink, and the printing chip 28, the heat sink 24 which radiates heat in the heat which the printing chip 28 generated, and the printing chip 28. The printing chip 28 can be considered as the configuration which has two or more nozzles for the ink regurgitation at a time for example, corresponding to each ink. Two or more manifolds 25 are formed corresponding to each ink passage. In the connection section 22 by the side of the ink tank unit 20 of a manifold 25, it has the projection 27 for pressing an elastic member 10. Like the heights 8 of the ink tank unit 20, this projection 27 is formed so that each ink passage may be isolated. Moreover, the pawl 9 of the ink tank unit 20 and the rib 26 which fits in are formed.

[0021] If such a recording head unit 21 and the ink tank unit 20 explained by drawing 1 thru/or drawing 3 are combined on both sides of an elastic member 10, as shown in drawing 5, an ink jet head cartidge will be completed. That is, the heights 8 of the ink tank unit 20 contact an elastic member 10, and the projection 27 by which it was prepared in the field of the opposite side of an elastic member 10 at the connection section 22 of the recording head unit 21 contacts. And by carrying out the pressure welding of the recording head unit 21 and the ink tank unit 20 further, the pawl 9 which has elastic force will fit in with a rib 26, and an elastic member 10 will be maintained by the condition of having been pressed by heights 8 and projection 27. Thereby, the joint of the ink tank unit 20 and an elastic member 10 and the joint of the recording head unit 21 and an elastic member 10 are sealed for every ink passage, and faults, such as leakage of ink

and mixing of ink, are not generated.

[0022] Moreover, a substrate 23 and a heat sink 24 are inserted into a slot 5 at the time of association with the ink tank unit 20 and the recording head unit 21. And the fitting member 14 prepared in the ink tank unit 20 fits into the hole prepared in the heat sink 24, and association of the ink tank unit 20 and the recording head unit 21 is performed also in this part. At this time, a substrate 23 is electrically combined with the terminal assembly which was prepared in the ink tank 1 and which is not illustrated. A terminal assembly is electrically combined with an ink jet recording apparatus, when an ink jet recording apparatus is equipped with an ink jet head cartidge, and exchange of printing data, transfer of a control signal, etc. are performed.

[0023] An ink jet head cartidge is used, ink is lost, and it becomes used, and when collected, the ink tank unit 20, an elastic member 10, and the recording head unit 21 are decomposed by opening a pawl 9 and the fitting member 14. It becomes recyclable [equipping a new ink tank unit with the reusable recording head unit 21 through a new elastic member, using as an ink jet head cartidge again, or filling up the ink tank unit 20 with ink again, exchanging for a new thing the recording head unit and elastic member which deteriorated, and using as an ink jet head cartidge again conversely, by this, etc. / components]. While realizing saving resources and lowering the price of an ink jet head cartidge by this, the running cost of an ink jet recording device can be reduced.

[0024] In an above-mentioned example, although heights 8 and projection 27 were prepared for the both sides by the side of the ink tank unit 20 and the recording head unit 21, it can also constitute only from either. For example, heights 8 are formed, the connection section 22 can be pasted and an elastic member 10 can be constituted. Moreover, an elastic member 10 can be pasted up on the 2nd bottom plate 6, and it can also constitute so that a pressure welding may be carried out to projection 27.

[0025] Heights 8 and projection 27 can make the cross section a triangle. Thus, if constituted, since the pressure welding of the triangular top-most vertices will be carried out to an elastic member 10, a pressure concentrates on top-most vertices and the sealing nature by press improves more. Of course, you may be other cross-section configurations.

[0026] Drawing 6 is the approximate account Fig. of an example of the ink supply actuation in one example of the ink jet head cartidge of this invention. The notation in drawing is the same as that of each above-mentioned drawing. Drawing 6 (A) shows the time of ink fullness. In this condition, it fills up with ink to the limitation which can be held according to the capillary tube force according [about 100% of ink] to the internal felt 2 to the felt room 13 in the ink room 13. In this condition, ink is held by the capillary tube force of the felt 2, and it is maintained at negative pressure.

[0027] If printing starts, with the printing chip 28, ink will be consumed and ink will be supplied only for the amount of the consumed ink to the printing chip 28 through a manifold 25 from the ink room 12. While holding ink with the felt 2 in connection with it, ink moves to the ink room 12 from the felt 2, and air spreads on the felt 2 gradually from the atmospheric-air free passage hole 16. At this time, ink is supplied to the printing chip 28 by the capillary tube force of the felt 2 with the stable negative pressure.

[0028] If the ink in the felt room 13 is consumed mostly, air will arrive at the front face of the reticulated member 3. If ink is furthermore consumed and a certain fixed negative pressure value (bubble point ** of the ink determined by the filtration accuracy of the reticulated member 3) will join the reticulated member 3, air will serve as air bubbles through the meniscus of the ink currently formed on the reticulated member 3, and it will enter in the ink room 12. As for the

negative pressure in the ink room 12, only the part of air bubbles is eased. This condition is shown in drawing 6 (B). The ink room 12 and the printing chip 28 are maintained at almost fixed negative pressure until the ink in the ink room 12 is lost by repeating this actuation.

[0029] Although there is a possibility that the meniscus of ink may no longer be formed in the reticulated member 3 when air bubbles are generated in the reticulated member 3 and the air bubbles pile up in the field of the reticulated member 3. When the core material 4 is formed in contact with the reticulated member 3 and this core material 4 is always in contact with the ink in the ink room 12, ink is supplied to the reticulated member 3 by the capillary tube force of a core material 4, the reticulated member 3 is held at the condition of having always got wet in ink, and the meniscus of ink is not torn.

[0030] The environment of a perimeter, such as changing an outside atmospheric pressure and changing outside air temperature, may change. First, since the atmospheric pressure which the tip of the nozzle of the ink jet head 1 receives is the same as the atmospheric pressure which the absorption member 9 receives from an atmospheric-air free passage hole when the main ink room is filled up with ink to the limit and ink is supplied from the subink room, even if an atmospheric pressure changes, pressure balancing does not collapse, but there is little effect.

[0031] Next, the case where the layer of air is formed in the main ink interior of a room is considered. Since the volume of the air space of the upper part of the ink room 12 expands in case outside air temperature rises when an outside atmospheric pressure descends or, the negative pressure value in the ink room 12 tends to become small relatively. Therefore, as shown in drawing 6 (C), the ink in the main ink room 4 passes the reticulated member 3, and is held with the felt 2 in the felt room 13. Thereby, the differential pressure of the pressure in the main ink room 4 and atmospheric pressure is maintained, and ink does not leak. Since the filter 7 is finer than the reticulated member 3 at this time, a filtration grain size passes a filter 7, and ink does not begin to leak from the ink jet head 1.

[0032] In order that the air space of the upper part of the ink room 12 may contract in case outside air temperature descends when an outside atmospheric pressure rises or, the negative pressure value in the main ink room 4 tends to become large relatively. In this case, like the time of consumption of ink, as shown in drawing 6 (B), the negative pressure inside the ink room 12 is kept constant by introducing air in the ink room 12. Moreover, when ink exists in the felt room 13, migration in the ink room 12 of ink arises, and the negative pressure in the ink room 12 is maintained. Ink does not leak in both cases.

[0033] Although above-mentioned explanation showed the configuration using the ink tank unit of structure which prepares two rooms, an ink room and a felt room, as a hold room of the ink by which two or more arrays are carried out, when using the ink tank unit which consists of hold rooms of the ink of only one room, this invention can be applied similarly. Moreover, even if it is a two-room configuration, the ink tank unit using the hold room of the ink of other configurations which do not use the reticulated member 3 and a core material 4 can apply this invention similarly. Thus, regardless of the configuration of an ink tank unit, it is possible to apply this invention.

[0034]

[Effect of the Invention] While preventing the fault of leakage and mixing of the ink for the bond part of a recording head and an ink tank, according to this invention, this part can be miniaturized by the easy configuration, so that clearly from the above explanation. Moreover, by the ability constituting a recording head and an ink tank disengageable, it dissociates after recovery and is effective in the ability to make recycle possible separately.

TECHNICAL FIELD

[Industrial Application] This invention relates to the ink jet head cartlidge used for the ink jet recording apparatus which records by breathing out ink.

PRIOR ART

[Description of the Prior Art] In recent years, the device set as the application object of an ink jet recording device has become wide range, and many ink jet cartridges which unified the recording head and the ink tank are introduced into the commercial scene. The ink passage which connects an ink tank and a recording head with actual goods has many for which the O ring is used as an ink leakage prevention means. Although there is no concern of the color mixture in ink passage of one ink jet cartridge what has ink of only one color, by the ink jet head cartlidge which unified yellow, the Magenta, and the recording head and ink tank of three colors of cyanogen, we are anxious about the problem of the color mixture in the connection of ink passage, for example.

[0003] As a well-known ink jet head cartlidge, For example, HEWLETT-PACKARD JOURNAL, AUGUST There is an ink jet cartridge which unified yellow, the Magenta, and the recording head and ink tank of three colors of cyanogen, and a part for the joint of ink passage is reported by this reference as indicated by "1992, VOLUME43 and NUMBER4, Automatic Assembly of theHP Desk Jet 500 C/Desk writer C Color Print Cartridge." According to the publication of this reference, the color mixture in ink passage is lost by applying adhesives to the perimeter of the feed hopper of three colors each.

[0004] However, by this approach, lock out of the passage by the flash of adhesives occurs, and there is concern which bars supply of ink. In order to prevent it, the coater of highly precise adhesives is required, and needed to prepare the inspection process of a spreading condition, and had led to the rise of a manufacturing cost.

[0005] In recent years, the demand of recycle of a product and components is increasing from positions, such as environmental protection and saving resources. However, with the means indicated by above-mentioned reference, although the recording head and the ink tank could be unified, it was not the optimal means to the demand of dissociating separately and recycling a recording head and an ink tank, after collecting ink jet cartridges. That is, since the recording head and the ink tank were pasted up with adhesives, it had the trouble that separation of a recording head and an ink tank was impossible.

[0006] As another cure, it is possible to equip independently a part for the bond part of each ink passage with an O ring etc., respectively. If an O ring is generally used, separation of separation between the ink passage of each color, ink leakage prevention, a recording head, and an ink tank should be able to be solved to coincidence. However, from constraint of the size of an O ring, it could not consider as the desired diameter of passage and desired passage spacing, especially was not able to miniaturize.

[0007] For example, also in the ink jet print head indicated by JP,1-110965,A, the ink in an ink tank passes along the ink passage where a front plate is constituted by the periphery of the shape

of a bead prepared in the closure plate by compressing, and is supplied to the print head. In this example, ink passage is connected by one place, without connecting using a closure member like an O ring for every ink passage. However, separating a recording head and an ink tank is not considered with such a configuration.

EFFECT OF THE INVENTION

[Effect of the Invention] While preventing the fault of leakage and mixing of the ink for the bond part of a recording head and an ink tank, according to this invention, this part can be miniaturized by the easy configuration, so that clearly from the above explanation. Moreover, by the ability constituting a recording head and an ink tank disengageable, it dissociates after recovery and is effective in the ability to make recycle possible separately.

TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] This invention was made in view of the situation mentioned above, and it miniaturizes this part while it separates between each ink passage in the bond part of a recording head and an ink tank and aims at ink leakage prevention, and it aims at offering the ink jet head cartlidge which can separate a recording head and an ink tank further.

MEANS

[Means for Solving the Problem] This invention is an ink jet head cartlidge which has two or more ink tanks which supply ink to a thing to said ink discharge part with the recording head unit which has the ink discharge part which is characterized by providing the following, and which carries out the regurgitation of the ink in an end section side. The elastic member in which it was prepared in the joining segment of said ink tank and said recording head unit, and the hole of only the number of passes of ink was drilled Heights for isolating ink passage to one [at least] field of this elastic member, and the field which confronts each other

[0010] Moreover, while it has further the engagement means which carries out engagement maintenance of said ink tank and said recording head unit and said engagement means connects a recording head unit with said ink tank, it is characterized by pressing said elastic member to said heights. The fitting section corresponding to the claw part in which elastic deformation is possible, and said claw part can constitute said engagement means.

OPERATION

[Function] According to this invention, in the joining segment of an ink tank and a recording head unit, when an elastic member is pressed by the heights prepared at least in one side by the side of an ink tank or a recording head unit, the positive sealing effectiveness can be acquired and this does not produce faults, such as leakage of ink, and mixing of ink. Heights can be prepared for the both sides by the side of an ink tank and a recording head unit, they can also be constituted so that it may press by heights from both sides of an elastic member, and they can acquire the more positive sealing effectiveness. An ink tank and a recording head unit consist of the press sections to the elastic member of heights disengageable. Moreover, the hole of only the ink number of passes is prepared in the elastic member, separation of two or more ink passage and sealing can be performed by one member, and it can miniaturize easily.

[0012] Thrust is automatically given to an elastic member at the same time an ink tank and a recording head unit are combined by establishing the engagement means which carries out engagement maintenance of an ink tank and the recording head unit. An ink tank and a recording head unit are [after collecting ink jet head cartlidges] separable by using the fitting section corresponding to the claw part in which elastic deformation is possible, and said claw part as an engagement means.

EXAMPLE

[Example] Drawing 1 and drawing 2 are the block diagrams of the ink tank unit in one example of the ink jet head cartlidge of this invention. the inside of drawing, and 1 -- an ink tank and 2 -- the felt and 3 -- a reticulated member and 4 -- a core material and 5 -- the 1st bottom plate and 6 -- the 2nd bottom plate and 7 -- a filter and 8 -- heights and 9 -- a pawl and 10 -- for an ink room and 13, as for a fitting member and 15, a felt room and 14 are [an elastic member and 11 / top covering and 12 / a slot and 16] atmospheric-air free passage holes. The illustrated ink tank unit shows as an example the case where it has the three hold sections of ink. The hold section of each ink can be filled up with the ink of each color of yellow, a Magenta, and cyanogen.

[0014] The ink tank 1 which contains ink is divided into the ink room 12 and the felt room 13 for every hold section of each ink. The ink room 12 stores ink. The felt 2 holding ink is built in the felt room 13. Moreover, in the connection section of the felt room 13 and the ink room 12, the reticulated member 3 and the core material 4 possess. The ink room 12 and the felt room 13 are open for free passage through this reticulated member 3. A core material 4 supplies the ink in the ink room 12 to the reticulated member 3. Thereby, the reticulated member 3 is held at the condition of having always got wet in ink.

[0015] As for the upper part of the ink tank 1, it is equipped with the top covering 11. To the top covering 11, it has the atmospheric-air free passage hole 16 in the up location of the felt room 13. Although the upper part of the ink room 12 is constituted at the time of use of an ink jet head cartlidge so that the ink room 12 may be sealed, it may prepare opening for pouring in ink at the time of manufacture, for example.

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ink room 12 is prepared in the 1st bottom plate 5, and it is equipped with the filter 7 which **** the dust in ink into the part of the hole, respectively. The passage of the ink drawn from the hole prepared in the 1st bottom plate 5 is formed in the 2nd bottom plate 6, and it is led to a joint with the recording head unit which ink flows and does not illustrate between the 1st bottom plate 5 and the 2nd bottom plate 6. Corresponding to each ink passage, the hole is prepared in the joint with the recording head unit of the 2nd bottom plate 6, and heights 8 are formed in it so that the part of each hole may be isolated. Moreover, the pawl 9 is formed in the 2nd bottom plate 6, and a recording head unit is stopped. On the other hand, the hole corresponding to each ink passage is prepared, by carrying out a pressure welding to the 2nd bottom plate 6, an elastic member 10 and heights 8 stick to the sheet-like elastic member 10, and each ink passage is sealed. The 1st bottom plate 5, the 2nd bottom plate 6, and the top covering 11 are fixed by ultrasonic welding, respectively. An adhesion means is not restricted to what is depended on ultrasonic welding, but can use various approaches, such as the usual adhesives and heat welding.

[0017] The slot 15 for containing further the electrical circuit part of the recording head unit which is not illustrated is formed in the ink tank 1, and when equipped with a recording head unit, it has the fitting member 14 for fixing an electrical circuit part.

[0018] Drawing 3 is the enlarged drawing of a joint with the recording head unit of the 2nd bottom plate 6. As shown in drawing 3 (B), the heights 8 prepared in the 2nd bottom plate 6 are formed so that the hole prepared corresponding to each ink passage may be surrounded. An elastic member 10 becomes good [the sealing nature of each ink passage] by carrying out a pressure welding to these heights 8. Thereby, in this joint, the ink of each ink passage is not mixed and it does not begin to leak. Furthermore, since two or more ink passage is combined using one elastic member 10 while being able to narrow spacing between each ink passage and being able to miniaturize compared with the case where an O ring etc. is used for every ink passage, components mark can be decreased.

[0019] Drawing 4 and drawing 5 are the sectional views in one example of the ink jet head cartidge of this invention. Among drawing, the same sign is given to the same part as drawing 1 and drawing 2 , and explanation is omitted. 20 -- an ink tank unit and 21 -- a recording head unit and 22 -- for a heat sink and 25, as for a rib and 27, a manifold and 26 are [the connection section and 23 / a substrate and 24 / a projection and 28] printing chips. Drawing 4 illustrates the condition that the ink tank unit and the recording head unit are separated, and drawing 5 is illustrating the condition of having been united.

[0020] The recording head unit 21 consists of manifolds 25 for supplying ink to the substrate 23 which tells an electrical signal to the printing chip 28 which carries out the regurgitation of the ink, and the printing chip 28, the heat sink 24 which radiates heat in the heat which the printing chip 28 generated, and the printing chip 28. The printing chip 28 can be considered as the configuration which has two or more nozzles for the ink regurgitation at a time for example, corresponding to each ink. Two or more manifolds 25 are formed corresponding to each ink passage. In the connection section 22 by the side of the ink tank unit 20 of a manifold 25, it has the projection 27 for pressing an elastic member 10. Like the heights 8 of the ink tank unit 20, this projection 27 is formed so that each ink passage may be isolated. Moreover, the pawl 9 of the ink tank unit 20 and the rib 26 which fits in are formed.

[0021] If such a recording head unit 21 and the ink tank unit 20 explained by drawing 1 thru/or drawing 3 are combined on both sides of an elastic member 10, as shown in drawing 5 , an ink jet head cartidge will be completed. That is, the heights 8 of the ink tank unit 20 contact an elastic member 10, and the projection 27 by which it was prepared in the field of the opposite

side of an elastic member 10 at the connection section 22 of the recording head unit 21 contacts. And by carrying out the pressure welding of the recording head unit 21 and the ink tank unit 20 further, the pawl 9 which has elastic force will fit in with a rib 26, and an elastic member 10 will be maintained by the condition of having been pressed by heights 8 and projection 27. Thereby, the joint of the ink tank unit 20 and an elastic member 10 and the joint of the recording head unit 21 and an elastic member 10 are sealed for every ink passage, and faults, such as leakage of ink and mixing of ink, are not generated.

[0022] Moreover, a substrate 23 and a heat sink 24 are inserted into a slot 5 at the time of association with the ink tank unit 20 and the recording head unit 21. And the fitting member 14 prepared in the ink tank unit 20 fits into the hole prepared in the heat sink 24, and association of the ink tank unit 20 and the recording head unit 21 is performed also in this part. At this time, a substrate 23 is electrically combined with the terminal assembly which was prepared in the ink tank 1 and which is not illustrated. A terminal assembly is electrically combined with an ink jet recording apparatus, when an ink jet recording apparatus is equipped with an ink jet head cartidge, and exchange of printing data, transfer of a control signal, etc. are performed.

[0023] An ink jet head cartidge is used, ink is lost, and it becomes used, and when collected, the ink tank unit 20, an elastic member 10, and the recording head unit 21 are decomposed by opening a pawl 9 and the fitting member 14. It becomes recyclable [equipping a new ink tank unit with the reusable recording head unit 21 through a new elastic member, using as an ink jet head cartidge again, or filling up the ink tank unit 20 with ink again, exchanging for a new thing the recording head unit and elastic member which deteriorated, and using as an ink jet head cartidge again conversely, by this, etc. / components]. While realizing saving resources and lowering the price of an ink jet head cartidge by this, the running cost of an ink jet recording device can be reduced.

[0024] In an above-mentioned example, although heights 8 and projection 27 were prepared for the both sides by the side of the ink tank unit 20 and the recording head unit 21, it can also constitute only from either. For example, heights 8 are formed, the connection section 22 can be pasted and an elastic member 10 can be constituted. Moreover, an elastic member 10 can be pasted up on the 2nd bottom plate 6, and it can also constitute so that a pressure welding may be carried out to projection 27.

[0025] Heights 8 and projection 27 can make the cross section a triangle. Thus, if constituted, since the pressure welding of the triangular top-most vertices will be carried out to an elastic member 10, a pressure concentrates on top-most vertices and the sealing nature by press improves more. Of course, you may be other cross-section configurations.

[0026] Drawing 6 is the approximate account Fig. of an example of the ink supply actuation in one example of the ink jet head cartidge of this invention. The notation in drawing is the same as that of each above-mentioned drawing. Drawing 6 (A) shows the time of ink fullness. In this condition, it fills up with ink to the limitation which can be held according to the capillary tube force according [about 100% of ink] to the internal felt 2 to the felt room 13 in the ink room 13. In this condition, ink is held by the capillary tube force of the felt 2, and it is maintained at negative pressure.

[0027] If printing starts, with the printing chip 28, ink will be consumed and ink will be supplied only for the amount of the consumed ink to the printing chip 28 through a manifold 25 from the ink room 12. While holding ink with the felt 2 in connection with it, ink moves to the ink room 12 from the felt 2, and air spreads on the felt 2 gradually from the atmospheric-air free passage hole 16. At this time, ink is supplied to the printing chip 28 by the capillary tube force of the felt

2 with the stable negative pressure.

[0028] If the ink in the felt room 13 is consumed mostly, air will arrive at the front face of the reticulated member 3. If ink is furthermore consumed and a certain fixed negative pressure value (bubble point ** of the ink determined by the filtration accuracy of the reticulated member 3) will join the reticulated member 3, air will serve as air bubbles through the meniscus of the ink currently formed on the reticulated member 3, and it will enter in the ink room 12. As for the negative pressure in the ink room 12, only the part of air bubbles is eased. This condition is shown in drawing 6 (B). The ink room 12 and the printing chip 28 are maintained at almost fixed negative pressure until the ink in the ink room 12 is lost by repeating this actuation.

[0029] Although there is a possibility that the meniscus of ink may no longer be formed in the reticulated member 3 when air bubbles are generated in the reticulated member 3 and the air bubbles pile up in the field of the reticulated member 3 When the core material 4 is formed in contact with the reticulated member 3 and this core material 4 is always in contact with the ink in the ink room 12, ink is supplied to the reticulated member 3 by the capillary tube force of a core material 4, the reticulated member 3 is held at the condition of having always got wet in ink, and the meniscus of ink is not torn.

[0030] The environment of a perimeter, such as changing an outside atmospheric pressure and changing outside air temperature, may change. First, since the atmospheric pressure which the tip of the nozzle of the ink jet head 1 receives is the same as the atmospheric pressure which the absorption member 9 receives from an atmospheric-air free passage hole when the main ink room is filled up with ink to the limit and ink is supplied from the subink room, even if an atmospheric pressure changes, pressure balancing does not collapse, but there is little effect.

[0031] Next, the case where the layer of air is formed in the main ink interior of a room is considered. Since the volume of the air space of the upper part of the ink room 12 expands in case outside air temperature rises when an outside atmospheric pressure descends or, the negative pressure value in the ink room 12 tends to become small relatively. Therefore, as shown in drawing 6 (C), the ink in the main ink room 4 passes the reticulated member 3, and is held with the felt 2 in the felt room 13. Thereby, the differential pressure of the pressure in the main ink room 4 and atmospheric pressure is maintained, and ink does not leak. Since the filter 7 is finer than the reticulated member 3 at this time, a filtration grain size passes a filter 7, and ink does not begin to leak from the ink jet head 1.

[0032] In order that the air space of the upper part of the ink room 12 may contract in case outside air temperature descends when an outside atmospheric pressure rises or, the negative pressure value in the main ink room 4 tends to become large relatively. In this case, like the time of consumption of ink, as shown in drawing 6 (B), the negative pressure inside the ink room 12 is kept constant by introducing air in the ink room 12. Moreover, when ink exists in the felt room 13, migration in the ink room 12 of ink arises, and the negative pressure in the ink room 12 is maintained. Ink does not leak in both cases.

[0033] Although above-mentioned explanation showed the configuration using the ink tank unit of structure which prepares two rooms, an ink room and a felt room, as a hold room of the ink by which two or more arrays are carried out, when using the ink tank unit which consists of hold rooms of the ink of only one room, this invention can be applied similarly. Moreover, even if it is a two-room configuration, the ink tank unit using the hold room of the ink of other configurations which do not use the reticulated member 3 and a core material 4 can apply this invention similarly. Thus, regardless of the configuration of an ink tank unit, it is possible to apply this invention.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is the block diagram of the ink tank unit in one example of the ink jet head cartlidge of this invention.

[Drawing 2] It is the block diagram of the ink tank unit in one example of the ink jet head cartlidge of this invention.

[Drawing 3] It is the enlarged drawing of a joint with the recording head unit of the 2nd bottom plate 6.

[Drawing 4] It is a sectional view at the time of the separation in one example of the ink jet head cartlidge of this invention.

[Drawing 5] It is a sectional view at the time of association in one example of the ink jet head cartlidge of this invention.

[Drawing 6] It is the approximate account Fig. of an example of the ink supply actuation in one example of the ink jet head cartlidge of this invention.

[Description of Notations]

1 Ink Tank, 2 Felt, 3 Reticulated Member, 4 Core Material, 5 The 1st bottom plate, 6 The 2nd bottom plate, 7 A filter, 8 Heights, 9 A pawl, 10 An elastic member, 11 top covering, 12 Ink room, 13 A felt room, 14 A fitting member, 15 A slot, 16 Atmospheric-air free passage hole, 20 An ink tank unit, 21 A recording head unit, 22 The connection section, 23 A substrate, 24 A heat sink, 25 A manifold, 26 A rib, 27 A projection, 28 Printing chip.

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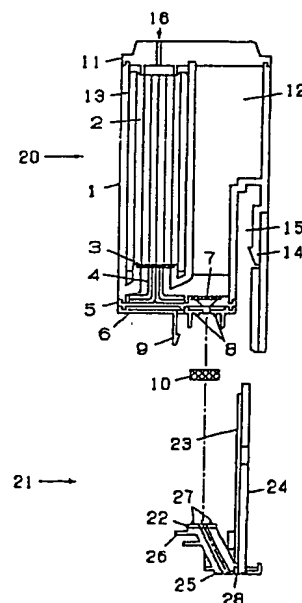
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(54) 【発明の名称】 インクジェットヘッドカートリッジ

(57) 【要約】

【目的】 記録ヘッドとインクタンクの結合部において、各インク流路間を分離し、インク漏れ防止をはかるとともに、この部分を小型化し、さらに、記録ヘッドとインクタンクの分離が可能なインクジェットヘッドカートリッジを提供する。

【構成】 インクタンクユニット20と記録ヘッドユニット21は、弾性部材10を介して結合される。インクタンクユニット20の第2の底板6の弾性部材10と接する面には、各インク流路を分離すべく凸部8が設けられている。また、記録ヘッドユニット21の連結部22には、同様の突起27が設けられている。インクタンクユニット20と記録ヘッドユニット21を結合すると、爪9とリブ26が嵌合し、凸部8と弾性部材10、及び、突起27と弾性部材10が圧接され、この部分で各インク流路のインクの混合や、漏れはない。また、この部分で分離し、リサイクルが可能である。



【特許請求の範囲】

【請求項 1】 インクを吐出するインク吐出部を一端部側に有する記録ヘッドユニットと、前記インク吐出部に対してインクを供給する複数のインクタンクを有するインクジェットヘッドカートリッジにおいて、前記インクタンクと前記記録ヘッドユニットの連結部分に設けられインクの流路数だけの孔が穿設された弾性部材と、該弾性部材の少なくとも一方の面と対峙する面にインク流路を隔離するための凸部を有することを特徴とするインクジェットヘッドカートリッジ。

【請求項 2】 前記インクタンクと前記記録ヘッドユニットに係合保持する係合手段を備え、前記係合手段は前記インクタンクと記録ヘッドユニットを連結するとともに、前記弾性部材を前記凸部に押圧することを特徴とする請求項 1 に記載のインクジェットヘッドカートリッジ。

【請求項 3】 前記係合手段は弾性変形可能な爪部と前記爪部に対応した嵌合部により構成されていることを特徴とする請求項 2 に記載のインクジェットヘッドカートリッジ。

【発明の詳細な説明】

【0001】

【産業上の利用分野】 本発明は、インクを吐出して記録を行なうインクジェット記録装置に用いるインクジェットヘッドカートリッジに関するものである。

【0002】

【従来の技術】 近年、インクジェット記録装置の適用対象となる機器は広範囲となっており、記録ヘッドとインクタンクを一体化したインクジェットカートリッジが、多数市場に導入されている。実際の商品では、インクタンクと記録ヘッドをつなぐインク流路には、インク漏れ防止手段としてリングが使用されているものが多い。1つのインクジェットカートリッジが1色のみのインクを有するものでは、インク流路における混色の懸念はないが、例えば、イエロー、マゼンタ、シアンの3色の記録ヘッドとインクタンクを一体化したインクジェットヘッドカートリッジでは、インク流路の接続部での混色の問題が懸念される。

【0003】 公知のインクジェットヘッドカートリッジとしては、例えば、HEWLETT-PACKARD JOURNAL, AUGUST 1992, VOLUME 43, NUMBER 4, "Automatic Assembly of the HP Desk Jet 500C/Desk writer C Color Print Cartridge" に記載されているように、イエロー、マゼンタ、シアンの3色の記録ヘッドとインクタンクを一体化したインクジェットカートリッジがあり、この文献では、インク流路の接合部分について報告されている。この文献の記載によれば、接着剤を各3色の供給口の周囲に塗ることによりインク流路にお

ける混色をなくしている。

【0004】 しかし、この方法では、接着剤のはみ出しによる流路の閉塞が発生し、インクの供給を妨げる懸念がある。それを未然に防ぐためには、高精度の接着剤の塗布装置が必要であり、また、塗布状態の検査工程を設ける必要もあり、製造コストの上昇につながっていた。

【0005】 近年、環境保護、省資源等の立場から、製品および部品のリサイクルの要求が高まっている。しかしながら、上述の文献に記載されている手段では、記録ヘッドとインクタンクを一体化できるがインクジェットカートリッジを回収後、記録ヘッドとインクタンクを個々に分離し、リサイクルするという要求に対して最適な手段ではなかった。すなわち、記録ヘッドとインクタンクを接着剤により接着しているため、記録ヘッドとインクタンクの分離が不可能であるという問題点を有していた。

【0006】 別の対策としては、各インク流路の結合部分にリング等をそれぞれ独立に装着することが考えられる。一般的にリングを用いれば、各色のインク流路間の分離、インク漏れ防止、記録ヘッドとインクタンクの分離が同時に解決できるはずである。しかし、リングのサイズの制約から、所望の流路径および流路間隔とすることはできず、特に小型化することはできなかった。

【0007】 例えば、特開平 1-110965 号公報に記載されているインクジェットプリントヘッドにおいても、インクタンク内のインクは、封止板に設けられたビード状の周縁に前面板が圧縮して構成されるインク流路を通して、プリントヘッドに供給されている。この例では、各インク流路ごとにリングのような封止部材を用いて接続せずに、1ヶ所でインク流路の接続を行なっている。しかし、このような構成では、記録ヘッドとインクタンクを分離することは考えられていない。

【0008】

【発明が解決しようとする課題】 本発明は、上述した事情に鑑みてなされたもので、記録ヘッドとインクタンクの結合部において、各インク流路間を分離し、インク漏れ防止をはかるとともに、この部分を小型化し、さらに、記録ヘッドとインクタンクの分離が可能なインクジェットヘッドカートリッジを提供することを目的とするものである。

【0009】

【課題を解決するための手段】 本発明は、インクを吐出するインク吐出部を一端部側に有する記録ヘッドユニットと、前記インク吐出部に対してインクを供給する複数のインクタンクを有するインクジェットヘッドカートリッジにおいて、前記インクタンクと前記記録ヘッドユニットの連結部分に設けられインクの流路数だけの孔が穿設された弾性部材と、該弾性部材の少なくとも一方の面と対峙する面にインク流路を隔離するための凸部を有す

ることを特徴とするものである。

【0010】また、前記インクタンクと前記記録ヘッドユニットを係合保持する係合手段をさらに備え、前記係合手段は前記インクタンクと記録ヘッドユニットを連結するとともに、前記弾性部材を前記凸部に押圧することを特徴とするものである。前記係合手段は、弾性変形可能な爪部と前記爪部に対応した嵌合部により構成することができる。

【0011】

【作用】本発明によれば、インクタンクと記録ヘッドユニットの連結部分において、インクタンク側あるいは記録ヘッドユニット側の少なくとも一方に設けられた凸部に弾性部材が押圧されることにより、確実な密閉効果を得ることができ、これによりインクの漏れやインクの混合などの不具合は生じない。凸部はインクタンク側及び記録ヘッドユニット側の双方に設け、弾性部材の両面から凸部で押圧するように構成することもでき、より確実な密閉効果を得ることができる。インクタンクと記録ヘッドユニットは、凸部の弾性部材への押圧部で分離可能に構成される。また、弾性部材にはインク流路数だけの孔が設けられており、複数のインク流路の分離、密閉を1つの部材で行なうことができ、容易に小型化することができる。

【0012】インクタンクと記録ヘッドユニットを係合保持する係合手段を設けることにより、インクタンクと記録ヘッドユニットが結合されると同時に、弾性部材に対して自動的に押圧力が与えられる。係合手段として、弾性変形可能な爪部と前記爪部に対応した嵌合部を用いることにより、インクジェットヘッドカートリッジを回収後、インクタンクと記録ヘッドユニットは分離が可能である。

【0013】

【実施例】図1、図2は、本発明のインクジェットヘッドカートリッジの一実施例におけるインクタンクユニットの構成図である。図中、1はインクタンク、2はフェルト、3は網状部材、4は芯材、5は第1の底板、6は第2の底板、7はフィルタ、8は凸部、9は爪、10は弾性部材、11はトップカバー、12はインク室、13はフェルト室、14は嵌合部材、15はスロット、16は大気連通孔である。図示したインクタンクユニットは、一例として、インクの収容部を3つ有する場合を示している。各インクの収容部には、例えば、イエロー、マゼンタ、シアンの各色のインクを充填しておくことができる。

【0014】インクを収納するインクタンク1は、各インクの収容部ごとに、インク室12及びフェルト室13に分割されている。インク室12は、インクを貯蔵する。フェルト室13には、インクを保持するフェルト2が内蔵されている。また、フェルト室13とインク室12の連結部には、網状部材3と芯材4が具備されてい

る。この網状部材3を介して、インク室12とフェルト室13は連通している。芯材4は、インク室12内のインクを網状部材3に供給する。これにより、網状部材3は、常にインクで濡れた状態に保持される。

【0015】インクタンク1の上部は、トップカバー11が装着される。トップカバー11には、フェルト室13の上部位置に大気連通孔16を有している。インク室12の上部は、インクジェットヘッドカートリッジの使用時にはインク室12を密閉するように構成されるが、例えば、製作時にインクを注入するための開口を設けてもよい。

【0016】インクタンク1の底部は、第1の底板5及び第2の底板6により閉じられている。第1の底板5には、各インク室12に対応して、各インク室12からインクを導出する孔が設けられており、その孔の部分に、インク中のゴミを捕収するフィルタ7がそれぞれ装着されている。第2の底板6には、第1の底板5に設けられた孔から導出されるインクの流路が形成されており、第1の底板5及び第2の底板6の間をインクが流れ、図示しない記録ヘッドユニットとの接合部に導かれる。第2の底板6の記録ヘッドユニットとの接合部には、各インク流路に対応して孔が設けられており、それぞれの孔の部分を隔離するように、凸部8が設けられている。また、第2の底板6には、爪9が設けられており、記録ヘッドユニットに係止される。一方、シート状の弾性部材10には、各インク流路に対応した孔が設けられており、第2の底板6に圧接されることにより、弾性部材10と凸部8が密着し、各インク流路は密閉される。第1の底板5、第2の底板6、トップカバー11は、それぞれ、超音波溶着で固定される。接着手段は超音波溶着によるものに限られず、通常の接着剤、熱融着等、種々の方法を用いることができる。

【0017】インクタンク1には、さらに、図示しない記録ヘッドユニットの電気回路部分を収納するためのスロット15が設けられており、記録ヘッドユニットが装着された際に、電気回路部分を固定するための嵌合部材14を有している。

【0018】図3は、第2の底板6の記録ヘッドユニットとの接合部の拡大図である。第2の底板6に設けられる凸部8は、図3(B)に示すように、各インク流路に対応して設けられた孔を囲むように設けられている。弾性部材10は、この凸部8に圧接されることにより、各インク流路の密閉性が良好となる。これにより、この接合部において、各インク流路のインクが混ざることとはなく、また、漏れ出すこともない。さらに、各インク流路ごとにOリング等を用いる場合に比べ、各インク流路間の間隔を狭めることができ、小型化できるとともに、1つの弾性部材10を用いて複数のインク流路の結合を行なうので、部品点数を減少させることができる。

【0019】図4、図5は、本発明のインクジェットヘ

ッドカートリッジの一実施例における断面図である。図中、図1、図2と同様の部分には同じ符号を付して説明を省略する。20はインクタンクユニット、21は記録ヘッドユニット、22は連結部、23は基板、24はヒートシンク、25はマニホールド、26はリブ、27は突起、28は印字チップである。図4は、インクタンクユニットと記録ヘッドユニットが分離されている状態を図示し、図5は、一体となった状態を図示している。

【0020】記録ヘッドユニット21は、インクを吐出する印字チップ28、印字チップ28に電気信号を伝える基板23、印字チップ28が発生した熱を放熱するヒートシンク24、印字チップ28にインクを供給するためのマニホールド25で構成される。印字チップ28は、例えば、各インクに対応して、インク吐出のためのノズルを複数本ずつ有する構成とすることができる。マニホールド25は、各インク流路に対応して複数設けられている。マニホールド25のインクタンクユニット20側の連結部22には、弾性部材10を押圧するための突起27を有している。この突起27は、インクタンクユニット20の凸部8と同様に、各インク流路を隔離するように設けられている。また、インクタンクユニット20の爪9と嵌合するリブ26が設けられている。

【0021】このような記録ヘッドユニット21と、図1乃至図3で説明したインクタンクユニット20を弾性部材10を挟んで結合させると、図5に示すように、インクジェットヘッドカートリッジが完成する。すなわち、インクタンクユニット20の凸部8が弾性部材10に当接し、弾性部材10の反対側の面に記録ヘッドユニット21の連結部22に設けられた突起27が当接する。そして、さらに記録ヘッドユニット21とインクタンクユニット20とを圧接することにより、弾性力を有する爪9がリブ26と嵌合し、弾性部材10は凸部8と突起27に押圧された状態に維持されることになる。これにより、インクタンクユニット20と弾性部材10との接合部、および、記録ヘッドユニット21と弾性部材10との接合部は、各インク流路ごとに密閉され、インクの漏れやインクの混合等の不具合は発生しない。

【0022】また、インクタンクユニット20と記録ヘッドユニット21との結合時に、基板23及びヒートシンク24は、スロット5内に挿入される。そして、インクタンクユニット20に設けられた嵌合部材14が、ヒートシンク24に設けられた孔に嵌合し、この部分でもインクタンクユニット20と記録ヘッドユニット21の結合が行なわれる。このとき、基板23は、インクタンク1に設けられた図示しない端子板と電氣的に結合する。端子板は、インクジェットヘッドカートリッジがインクジェット記録装置に装着されたときに、インクジェット記録装置と電氣的に結合し、印字データのやり取りや、制御信号の授受などが行なわれる。

【0023】インクジェットヘッドカートリッジが使用

され、インクがなくなって使用済みとなり、回収された場合、爪9及び嵌合部材14を開くことにより、インクタンクユニット20、弾性部材10、記録ヘッドユニット21は分解される。これにより、例えば、再利用可能な記録ヘッドユニット21を、新しい弾性部材を介して新たなインクタンクユニットに装着し、再びインクジェットヘッドカートリッジとして用いたり、逆に、インクタンクユニット20に再度インクを充填し、劣化した記録ヘッドユニット及び弾性部材を新しいものに交換して、再びインクジェットヘッドカートリッジとして用いるなど、部品のリサイクルが可能となる。これにより、省資源を実現するとともに、インクジェットヘッドカートリッジの価格を下げることも、インクジェット記録装置のランニングコストを低減させることができる。

【0024】上述の例では、インクタンクユニット20側及び記録ヘッドユニット21側の双方に、凸部8及び突起27を設けたが、どちらかのみで構成することもできる。例えば、凸部8を設け、弾性部材10を連結部22に接着して構成することができる。また、弾性部材10を第2の底板6に接着し、突起27と圧接するように構成することもできる。

【0025】凸部8及び突起27は、その断面を三角形とすることができる。このように構成すると、三角形の頂点が弾性部材10に圧接されるので、圧力が頂点に集中し、押圧による密閉性がより向上する。もちろん、他の断面形状であってもよい。

【0026】図6は、本発明のインクジェットヘッドカートリッジの一実施例におけるインク供給動作の一例の概略説明図である。図中の記号は上述の各図と同様である。図6(A)は、インク充填時を示している。この状態において、インク室13にはほぼ100%のインクが、フェルト室13には、内部のフェルト2による毛細管力によって保持できる限界までインクが充填されている。この状態では、フェルト2の毛細管力でインクが保持され、負圧に保たれている。

【0027】印字が始まると、印字チップ28でインクが消費され、消費されたインクの量だけ、インク室12からマニホールド25を介してインクが印字チップ28へ補給される。それに伴って、フェルト2でインクを保持している間は、フェルト2からインクがインク室12へ移動し、大気連通孔16から徐々に空気がフェルト2に広がってゆく。このとき、フェルト2の毛細管力により、印字チップ28には安定した負圧でインクが供給される。

【0028】フェルト室13内のインクがほぼ消費されると、網状部材3の表面に空気が到達する。さらにインクが消費されると、ある一定の負圧値(網状部材3の濾過精度によって決定されるインクのパブルポイント圧)が網状部材3に加わると、網状部材3上に形成されているインクのメニスカスを通して空気が気泡となって、イ

ンク室12内に入る。気泡の分だけインク室12内の負圧は緩和される。この状態を図6(B)に示している。この動作が繰り返されることにより、インク室12内のインクがなくなるまで、インク室12及び印字チップ28はほぼ一定の負圧に保たれる。

【0029】網状部材3において気泡が発生し、その気泡が網状部材3の面に滞留すると、網状部材3にインクのメニスカスが形成されなくなる恐れがあるが、網状部材3に接して芯材4を設けており、この芯材4がインク室12内のインクと常に接していることにより、芯材4の毛細管力によりインクが網状部材3に供給され、網状部材3は常にインクで濡れた状態に保持され、インクのメニスカスが破れることはない。

【0030】外気圧が変動したり、また、外気温が変動するなど、周囲の環境が変化する場合がある。まず、主インク室にインクが満杯に充填されており、副インク室からインクを供給しているときには、大気連通孔から吸収部材9が受ける大気圧と、インクジェットヘッド1のノズルの先端が受ける大気圧が同じであるので、大気圧が変化しても圧力バランスは崩れず、影響は少ない。

【0031】次に、主インク室内に空気の層が形成されている場合を考える。外気圧が下降するとき、または外気温が上昇する際には、インク室12の上部の空気層の体積が膨張するために、インク室12内の負圧値が相対的に小さくなるようにする。そのため、図6(C)に示すように、主インク室4内のインクが網状部材3を通過し、フェルト室13内のフェルト2で保持される。これにより、主インク室4内の圧力と大気圧との差圧を保ち、かつ、インクは漏れることはない。このとき、フィルタ7の方が網状部材3よりも濾過粒度が細かいので、フィルタ7を通過してインクジェットヘッド1からインクが漏れ出すことはない。

【0032】外気圧が上昇するとき、または外気温が下降する際には、インク室12の上部の空気層が収縮するために、主インク室4内の負圧値は相対的に大きくなるようにする。この場合には、インクの消費時と同様に、図6(B)に示すように、空気がインク室12内に導入されることによって、インク室12の内部の負圧を一定に保つ。また、フェルト室13内にインクが存在するときは、インクのインク室12への移動が生じ、インク室12内の負圧は保たれる。どちらの場合も、インクが漏れることはない。

【0033】上述の説明では、複数配列されるインクの

収容室として、インク室とフェルト室の2室を設ける構造のインクタンクユニットを用いる構成を示したが、1室のみのインクの収容室で構成されるインクタンクユニットを用いる場合にも、同様に本発明を適用することができる。また、2室構成であっても、網状部材3及び芯材4を用いない他の構成のインクの収容室を用いたインクタンクユニットでも、同様に本発明を適用できる。このように、インクタンクユニットの構成には関係なく、本発明を適用することが可能である。

【0034】

【発明の効果】以上の説明から明かなように、本発明によれば、簡単な構成により、記録ヘッドとインクタンクの結合部分でのインクの漏れや混合といった不具合を防止するとともに、この部分を小型化することができる。また、記録ヘッドとインクタンクを分離可能に構成できることにより、回収後分離し、個々にリサイクルを可能とすることができるという効果がある。

【図面の簡単な説明】

【図1】 本発明のインクジェットヘッドカートリッジの一実施例におけるインクタンクユニットの構成図である。

【図2】 本発明のインクジェットヘッドカートリッジの一実施例におけるインクタンクユニットの構成図である。

【図3】 第2の底板6の記録ヘッドユニットとの接合部の拡大図である。

【図4】 本発明のインクジェットヘッドカートリッジの一実施例における分離時の断面図である。

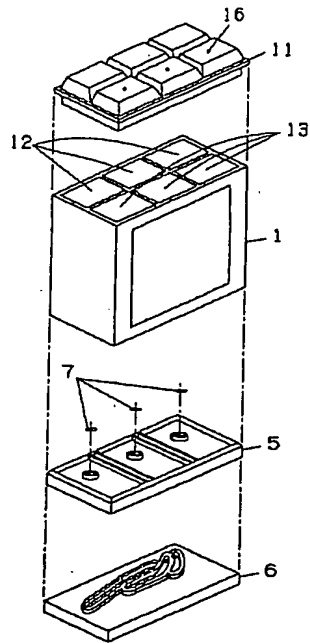
【図5】 本発明のインクジェットヘッドカートリッジの一実施例における結合時の断面図である。

【図6】 本発明のインクジェットヘッドカートリッジの一実施例におけるインク供給動作の一例の概略説明図である。

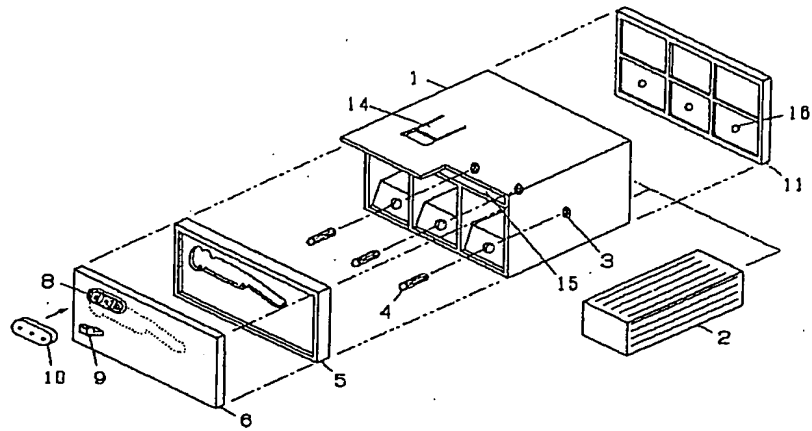
【符号の説明】

1 インクタンク、2 フェルト、3 網状部材、4 芯材、5 第1の底板、6 第2の底板、7 フィルタ、8 凸部、9 爪、10 弾性部材、11 トップカバー、12 インク室、13 フェルト室、14 嵌合部材、15 スロット、16 大気連通孔、20 インクタンクユニット、21 記録ヘッドユニット、22 連結部、23 基板、24 ヒートシンク、25 マニホールド、26 リブ、27 突起、28 印字チップ。

【図1】



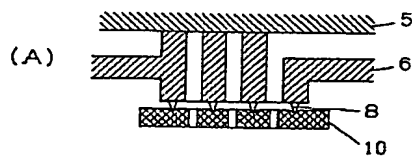
【図2】



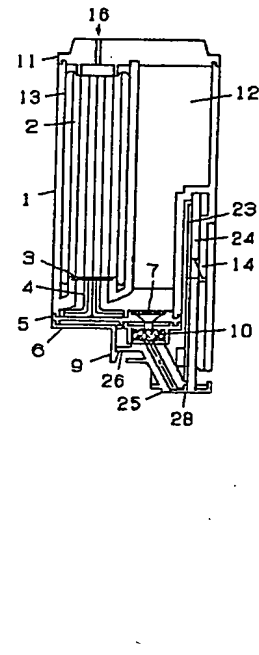
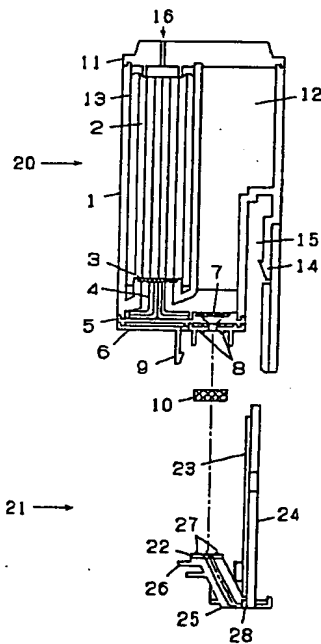
【図4】

【図5】

【図3】



(B)



【図6】

